



U.S. Department of Energy
Office of River Protection

P.O. Box 450
Richland, Washington 99352

02-OSR-0533

Mr. R. F. Naventi, Project Manager
Bechtel National, Inc.
3000 George Washington Way
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC27-01RV14136 – INSPECTION REPORT IR-02-014
ON-LOCATION INSPECTION FOR THE PERIOD AUGUST 24 THROUGH OCTOBER 10,
2002

This letter forwards the results of the subject inspection. The inspection team concluded the Waste Treatment Plant Contractor was conducting construction activities in accordance with the Contract, Authorization Basis, and applicable Contractor procedures and technical specifications with three exceptions.

These exceptions, Two Findings (one with two examples), are documented in the Notice of Finding (Enclosure 1). The inspectors found the Material Testing subcontractor was not complying with code requirements regarding temperature control and calibration associated with water storage tanks used for storage of concrete test specimens, and Field Project Document Control failed to ensure current revisions of drawings were available for use at the construction site. Details of the inspection, including the Findings, are documented in the enclosed inspection report (Enclosure 2).

If you have any questions, please contact me, or your staff may call Pat Carier, Office of Safety Regulation, (509) 376-3574.

Sincerely,

Roy J. Schepens
Manager

OSR:JWM

Enclosures (2)

cc w/encls:
W. R. Spezialetti, BNI

NOTICE OF FINDING

Section C, "Statement of Work," Standard 7, "Environment, Safety, Quality, and Health," of the Contract,¹ defines Bechtel National, Inc.'s (the Contractor) responsibilities under the Contract as they relate to conventional non-radiological worker safety and health; radiological, nuclear, and process safety; environmental protection; and quality assurance.

Standard 7, Section (d) of the Contract requires the Contractor to develop and implement an integrated, standards-based, safety management program to ensure that radiological, nuclear, and process safety requirements are defined, implemented, and maintained. The Contractor is required to conduct work in accordance with the Contractor-developed and Department of Energy (DOE)-approved Safety Requirements Document (SRD). The Contractor's SRD was defined in 24590-WTP-SRD-ESH-01-001-02, Rev. 0, dated October 14, 2001.

Standard 7, Section (e)(3), "Quality Assurance," of the Contract requires the Contractor "to develop a QA [Quality Assurance] Program, supported by documentation that describes overall implementation of QA requirements. Documentation shall identify the procedures, instructions, and manuals used to implement the Contractor's QA program within the Contractor's scope of work."

The Contractor's *Quality Assurance Manual*, 24590-WTP-QAM-QA-01-001 (QAM), Revision 0, dated August 31, 2001, contains the policies, which establish the QA requirements for the project. QAM Policy Q-05.1, "Instructions, Procedures, and Drawings," Section 3.1.1 states "Activities affecting quality shall be prescribed by and performed in accordance with documented instructions, procedures, and drawings of the type appropriated to the circumstances..."

During the performance of on-location inspections for the period August 24 through October 10, 2002, at the Waste Treatment Plant construction site, the following items were identified:

- 1.a. The SRD, Volume II, Safety Criteria (SC) 4.1-2, specifies as an implementing code, ACI 349.97, *Code Requirements for Nuclear Safety-Related Concrete Structures*. This American Concrete Institute (ACI) code requires concrete cylinders for strength tests be molded and laboratory-cured in accordance with American Society for Testing and Material (ASTM) C31, *Standard Practice for Making and Curing Concrete Test Specimens in the Field*. Paragraph 9.2.3.1 of ASTM C31, states "The curing requirements for water storage tanks, moist rooms and cabinets is referenced in ASTM C511-98, *Standard Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes*." Paragraph 2 of ASTM C511-98, references ASTM Standard E77, *Test Methods for the Inspection and Verification of Thermometers*, as the Standard used for calibrating the thermometers used for recording the temperature of the water in the storage tanks.

¹ Contract No. DE-AC27-01RV14136, between U.S. Department of Energy and Bechtel National, Inc., dated December 11, 2000.

Contrary to the above, calibrations of thermometers C000030 and C000069, used to monitor the temperature of the water in the storage tanks, were not performed in accordance with ASTM E77.

Failure to ensure the temperature monitors were calibrated in accordance with ASTM E77 is a Finding against SRD SC 4.1-2. (See IR-02-014, Section 1.3, IR-02-014-01a-FIN)

- 1.b. ASTM C 511-98, Section 4.4.1 requires, as an option, the temperature in the space where the concrete curing storage tanks are located be controlled between $23.0^{\circ}\text{C} \pm 2.0^{\circ}\text{C}$ ($73.4^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$). If this not performed, the standard requires each tank located in a space not controlled at $23.0^{\circ}\text{C} \pm 2.0^{\circ}\text{C}$ be equipped with a recording thermometer with its sensing element in the storage water.

Contrary to the above, the ambient temperature was not controlled between $23.0^{\circ}\text{C} \pm 2.0^{\circ}\text{C}$ in the space where the concrete curing storage tanks were located and was utilizing only one 7-day chart recorder thermometer, located within the middle tank of each of the three and four tank in-line configurations.

This is a Finding for failure to comply with SRD SC 4.1-2 regarding the requirement to provide each concrete curing tank with a recording thermometer. (See IR-02-014, Section 1.3, IR-02-014-01b-FIN)

2. Construction procedure 24590-WTP-GPP-CON-7107, *Field Project Document Control*, Revision 0, dated April 15, 2002, paragraph 3.2.3, "Field Project Document Control Supervisor Responsibilities", stated "The FPDC [Field Project Document Control] Supervisor is responsible for implementing the requirements of this procedure, for ensuring that documents are properly received, reviewed, logged, routed and filed, and for ensuring that the current revision of documents are available for use at the construction site."

Contrary to the above, on September 18, 2002, the control area 140 stick drawings contained drawing 24590-HLW-DB-S13T-00001, Revision 6, the current drawing should have been Revision 7, issued about 1 ½ months prior to the inspection; contained drawing 24590-HLW-DG-S13T-00007007, Revision 5 and 6; and contained drawing 24590-HLW-DG-S13T-00007008, Revision 5 and 6. Subsequent to identification of these examples of incorrect drawings in the controlled sticks, the Contractor performed a full review of the field controlled drawing sticks and identified approximately 30 drawing errors.

Failure to ensure current revisions of drawings were available for use at the construction site is a Finding against QAM Policy Q-05.1 regarding the requirement to follow procedures, specifically procedure 24590-WTP-GPP-CON-7107. (See IR-02-014, Section 1.5, IR-02-014-02-FIN)

The Office of River Protection requires the Contractor to provide, within 30 days of the date of the cover letter that transmits this Notice, a reply to these Findings. The reply should include: (1) admission or denial of the alleged Findings; (2) the reason for the Findings, if admitted, and if

denied, the reason why; (3) the corrective steps that have been taken and the results achieved; (4) the corrective steps that will be taken to avoid further Findings; and (5) the date when full compliance with the applicable commitments will be achieved. When good cause is shown, consideration will be given to extending the requested response time.

U.S. DEPARTMENT OF ENERGY
Office of River Protection

INSPECTION: On-location Inspection Report for the Period August 24 through October 10, 2002

REPORT NO: IR-02-014

FACILITY: Bechtel National, Inc.

LOCATION: 3000 George Washington Way
Richland, Washington 99352

DATES: August 24 through October 10, 2002

INSPECTORS: J. McCormick-Barger, Sr. Regulatory Technical Advisor, Inspection Lead
M. Evarts, Consultant
H. Doan, Consultant
J. Mohatt, Consultant
M. Summers, Consultant

APPROVED BY: P. Carrier, Verification and Confirmation Official
Office of Safety Regulation

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EXECUTIVE SUMMARY

On-location Inspection Report for Period of August 24 through October 10, 2002
Inspection Report Number IR-02-014

INTRODUCTION

This inspection of Bechtel National, Inc. (the Contractor) construction activities covered the following areas:

- Observation of Important to Safety (ITS) Structural Backfill and Compaction Activities (Section 1.2)
- Assessment of the Materials Testing Subcontractor Activities (Section 1.3)
- Adequacy of Fire Protection Piping System Work Activities (Section 1.4)
- Forms, Reinforcement Steel, and Embedded Steel Items Associated with Concrete Placements (Section 1.5)
- Installation of a Temporary Construction Opening in the Law Basemat (Section 1.6)
- Law Cold Joint Recovery Actions (Section 1.7)
- Industrial Health and Safety (IH&S) Oversight (Section 1.8).

Significant Observations and Conclusions:

- The Contractor's proof-rolling and structural backfill and compaction activities adjacent to the LAW basemat were conducted in accordance with established procedures and engineering technical specifications. (Section 1.2)
- The Materials Testing subcontractor did not comply with the requirements of ASTM C511-98 regarding temperature control and calibration associated with the water storage tanks used for storage and curing of concrete test specimens. This resulted in two Findings against Safety Requirements Document, Safety Criterion 4.1.2 (Findings IR-02-014-01a & b-FIN). (Section 1.3)
- The Contractor performed hydrostatic testing of the firewater piping in accordance with established procedures and National Fire Protection Association (NFPA) 24 requirements. (Section 1.4)
- The Materials Testing subcontractor did not consistently comply with engineering technical specification requirements to visually observe concrete mix for consistency and uniformity. Actions were being taken to address the issue. This issue was considered a non-cited Finding. (Section 1.5)

- Reinforcement steel installations and other attributes associated with six concrete placements observed were being performed in accordance with the established procedures, specifications, and drawings. Qualified inspectors performed Quality Control (QC) activities for this work in a thorough manner, and the QC inspection activities were adequately documented. One Finding was identified for failure to ensure current revisions of drawings were available for use at the construction site (IR-02-014-02-FIN). (Section 1.5)
- The Contractor's initial actions regarding installation of a temporary construction opening on the west perimeter wall of the Low Activity Waste (LAW) facility at elevation (-) 21' were not adequate, in that engineering approval of the rebar configuration had not been obtained. After inspectors discussed this with construction management, and before the applicable LAW basemat concrete placement was made, an engineering approved FCR was generated to document the rebar modification. (Section 1.6)
- The activities undergone to date by the Contractor to address recovery actions associated with the LAW concrete cold joint were acceptable. The Contractor plans additional work to prepare the cold joint and to evaluate the cold joint for future concrete placements. (Section 1.7)
- The Contractor had acceptably implemented their program for industrial health and safety, with a few minor exceptions, which were promptly corrected during the inspection period. (Section 1.8)

Table of Contents

1.0	REPORT DETAILS.....	1
1.1	Introduction.....	1
1.2	Observation of ITS Structural Backfill and Compaction Activities (Inspection Technical Procedure (ITP) I-112).....	1
1.2.1	Inspection Scope.....	1
1.2.2	Observations and Assessments.....	1
1.2.3	Conclusions.....	2
1.3	Assessment of the Materials Testing Subcontractor Activities (ITP I-113).....	2
1.3.1	Inspection Scope.....	2
1.3.2	Observations and Assessments.....	2
1.3.3	Conclusions.....	5
1.4	Adequacy of Fire Protection Piping System Work Activities (ITP I-138).....	5
1.4.1	Inspection Scope.....	5
1.4.2	Observations and Assessments.....	5
1.4.3	Conclusions.....	6
1.5	Forms, Reinforcement Steel, and Embedded Steel Items Associated with Concrete Placements (ITP I-113).....	6
1.5.1	Inspection Scope.....	6
1.5.2	Observations and Assessments.....	7
1.5.3	Conclusions.....	10
1.6	Installation of a Temporary Construction Opening in the LAW Basemat (ITP I-113).....	11
1.6.1	Inspection Scope.....	11
1.6.2	Observations and Assessments.....	11
1.6.3	Conclusions.....	11
1.7	LAW Cold Joint Recovery Actions (ITP I-113).....	12
1.7.1	Inspection Scope.....	12
1.7.2	Observations and Assessments.....	12
1.7.3	Conclusions.....	14
1.8	Industrial Health and Safety (IH&S) Oversight (ITP I-161).....	14
1.8.1	Inspection Scope.....	14
1.8.2	Observations and Assessments.....	14
1.8.3	Conclusions.....	18
2.0	EXIT MEETING SUMMARY.....	18
3.0	REPORT BACKGROUND INFORMATION.....	18
3.1	Partial List of Persons Contacted.....	18
3.2	List of Inspection Procedures Used.....	19
3.3	List of Items Opened, Closed, and Discussed.....	19
3.4	List of Acronyms.....	20

ON-LOCATION INSPECTION REPORT FOR PERIOD OF AUGUST 24 THROUGH OCTOBER 10, 2002

1.0 REPORT DETAILS

1.1 Introduction

This inspection assessed the Contractor's performance of important-to-safety (ITS) structural backfill and compaction activities; Materials Testing subcontractor activities; recovery activities associated with the Low Activity Waste (LAW) basemat concrete cold joint; installation of forms, reinforcing steel and embedments; and concrete placements for conformance with regulatory requirements, specified in the Quality Assurance Manual (QAM), Safety Requirements Document (SRD), design documents, approved work procedures, and committed codes and standards. The inspectors also reviewed the Contractor's implementation of firewater piping system construction activities, and certain aspects of its Industrial Health and Safety program, including observing Contractor and subcontractor worker safety practices.

Details and conclusions regarding this inspection are described below.

1.2 Observation of ITS Structural Backfill and Compaction Activities (Inspection Technical Procedure (ITP) I-112)

1.2.1 Inspection Scope

The inspectors examined the Contractor and subcontractor procedures and engineering technical specifications governing the installation of ITS structural backfill, to determine whether the specified activities conformed to authorization basis and industry codes and standards, specified in the SRD, Volume II, Safety Criterion (SC) 4.1-2. Further, the inspectors examined the conduct of structural backfill installation activities in the field to assess whether those activities were conducted in accordance with program, procedure, and authorization basis requirements.

1.2.2 Observations and Assessments

The inspectors examined the following documents governing the testing and the inspection of ITS structural backfill and determined they addressed the requirements of SRD SC 4.1-2 including the specified codes and standards:

- 24590-BOF-3PS-CE01-T0001, *Engineering Specification For Structural Backfill*, Revision 3, dated March 12, 2002.
- 24590-BOF-3PS-C000-T0001, *Engineering Specification For Materials Testing Services*, Revision 2, dated July 12, 2002.
- FCR 24590-WTP-FCR-C-02-044, Increase loose lift thickness to 14 inches.

The inspectors observed the areas to be backfilled, adjacent to the LAW basemat, were cleaned of debris and unsuitable materials prior to the start of backfilling.

The inspectors observed the conduct of compaction control verification (Proof Roll) of the top 12 inches of the exposed LAW sub-grade, northwest corner adjacent to the Law basemat, elevation 651.58'. The inspectors observed the Contractor performing compaction activities of the existing sub-grade, and the Materials Testing subcontractor performing in-place density tests. Testing of the sub-grade was found acceptable. The inspectors concluded the proof roll had been performed in accordance with the Contractor's established requirements and procedures and yielded acceptable results.

The inspectors observed the conduct of the structural backfilling, northwest and northeast corners adjacent to the LAW basemat, elevation 654.7' and 652.0'. The inspectors observed the backfill material being blended, and water added prior to being placed adjacent to the building. Material was placed in 14 inch deep loose lifts as allowed by Field Change Request 24590-WTP-FCR-C-02-044. Compaction was performed by use of a self propelled, heavy plate vibratory wacker. During the testing of the structural backfill, tests that fell below the required minimum compaction percentage were identified as failed tests on the In Place Density & Moisture Test Reports. Areas of failure were reworked by the Contractor, and identified for retest. Retest areas were found acceptable, and the inspectors observed the structural backfill was tight and unyielding.

1.2.3 Conclusions

The Contractor's proof-rolling and structural backfill and compaction activities adjacent to the LAW basemat were conducted in accordance with established procedures and engineering technical specifications governing the installation of ITS structural backfill.

1.3 Assessment of the Materials Testing Subcontractor Activities (ITP I-113)

1.3.1 Inspection Scope

The inspectors examined the Materials Testing subcontractor's procedures, and engineering technical specifications, governing the testing of ITS structural concrete, to determine whether the activities conformed to authorization basis and industry standard requirements. In addition, the inspectors examined the subcontractor's activities for conformance with the applicable ASTM and American Concrete Institute (ACI) standards, and the SRD 4.0, *Engineering and Design*.

1.3.2 Observations and Assessments

The inspectors examined the following documents governing the material testing and inspection of ITS structural concrete:

- 24590-WTP-3PS-DB01-T0001, *Engineering Specification For Furnishing and Delivering Ready-Mixed Concrete*, Revision 3, dated July 31, 2002.
- 24590-BOF-3PS-C000-T0001, *Engineering Specification For Materials Testing Services*, Revision 2, dated July 12, 2002.
- ASTM C 511-98, *Standard Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes*.

Materials Testing subcontractor in house procedures:

- P-C1064-99, *Standard Test Method For Temperature of Freshly Mixed Portland Cement Concrete*, Issue 1, Revision 1, dated April 26, 2002.
- P-C138-00, *Standard Test Method For Unit Weight and Yield Of Concrete*, Issue 1, Revision 1, dated April 24, 2002.
- P-C143-00, *Standard Test Method For Slump of Hydraulic Cement Concrete*, Issue 1, Revision 2, dated May 20, 2002.
- P-C231-97, *Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method*, Issue 1, Revision 1, dated April 24, 2002.
- P-C31-00, *Making and Curing Concrete Test Specimens in the Field*, Issue 1, Revision 1, dated April 24, 2002.
- P-C39-01, *Compressive Strength of Cylindrical Concrete Specimens*, Issue 1, Revision 1, dated April 24, 2002.
- P-D75-97, *Aggregate Sampling (Stockpiles and Process Flows)*, Issue 2, Revision 2, dated April 18, 2002.
- P-D-2216-98, *Moisture Determination*, Issue 2, Revision 2, dated December 7, 2001.

The inspectors examined the Materials Testing subcontractor's in-house procedures, and Contractor engineering technical specifications as referenced above, governing the testing of ITS structural concrete. The inspectors concluded the procedures and technical specifications referenced and contained the proper ASTM standard requirements necessary to perform the testing as required by SRD Safety Criteria (SC) 4.1-2.

The inspectors examined the on-site testing facility soils and concrete testing apparatus, used in the testing of ITS concrete. The inspectors verified calibrations for selected equipment, which, with one exception described below, were current and the appropriate calibration stickers were attached.

The inspectors examined the calibration records of the Materials Testing subcontractor's recording thermometers in the curing tanks for concrete test cylinders. The Contractor's *Engineering Specification for Materials Testing Services*, paragraph 3.2.10, states, "High-Workability Concrete and regular concrete cylinders shall be initially cured on site, and then transported to the testing location in conformance with ASTM C31 within 48 hours after placement." SRD SC 4.1-2 specifies, as implementing codes and standards, ACI 349.97, *Code Requirements for Nuclear Safety-Related Concrete Structures*. This ACI requires cylinders for strength test be molded and laboratory-cured in accordance with ASTM C31. ASTM C31-2000, *Standard Practice for Making and Curing Concrete Test Specimens in the Field*, paragraph 9.2.3.1, states, "The curing requirements for water storage tanks, moist rooms and cabinets is referenced in ASTM C511-98, *Standard Specification for Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes*", and paragraph 2, references ASTM Standard E77, *Test Methods for the Inspection and Verification of Thermometers*, as the Standard used for calibrating the thermometers used for recording the temperature of the water in the storage tanks. A vendor hired by the subcontractor was performing the calibrations. The calibration reports 02-097 and 02-158 supplied by the vendor for recording thermometers C000030 and C000069 stated the instrument used by the vendor to calibrate the above recording thermometers was traceable to a national standard in accordance with ANSI-Z540.1. The calibration reports did not reflect that the calibrations were performed in accordance with ASTM E77. Failure to ensure the temperature monitors were calibrated in accordance with ASTM E77 is an example of a Finding against SRD SC 4.1-2 (IR-02-014-01a-FIN).

The inspectors examined the water storage tanks used for storage of the concrete test specimens, located at the on-site testing facilities curing room. The inspectors verified the hydrated lime for concrete test specimens, required by ASTM C 511-98, was implemented in the storage tanks, and the closed circulating water system between storage tanks was being used as required by ASTM C 511-98. The inspectors determined the Materials Testing subcontractor was not in conformance with the ASTM C 511-98, Section 4.4.1 which requires, as an option, the temperature in the space where the storage tanks are located to be controlled between $23.0^{\circ}\text{C} \pm 2.0^{\circ}\text{C}$ ($73.4^{\circ}\text{F} \pm 3.6^{\circ}\text{F}$). With this not being performed, the standard required each tank located in a space not controlled at $23.0^{\circ}\text{C} \pm 2.0^{\circ}\text{C}$ to be equipped with a recording thermometer with its sensing element in the storage water. The subcontractor was utilizing only one 7-day chart recorder thermometer, located within the middle tank of each of the three and four tank in-line configurations. This is an additional example of a Finding for failure to comply with SRD SC 4.1-2 (IR-02-014-01b-FIN).

The tank heaters were also located in the same tanks as the 7-day chart recording thermometers. The inspectors examined temperatures of the storage tanks adjacent to the temperature controlled storage tanks, using a calibrated thermometer supplied by the Materials Testing subcontractor, and found the temperatures varied from 1.5°F to 2°F on the lower end than what the controlled tanks were reading. The temperatures at the time of the observation were still within the tolerances as described in ASTM C 511. The inspectors examined the chart recording discs and observed that a 70°F temperature was recorded at an earlier time, with this in mind, and the observations that were performed on adjacent storage tanks regarding the difference in temperatures, the adjacent storage tanks may have been out of tolerance (i.e., if the monitored

tank was at 70°F, adjacent tanks could have been as low as 68°F which is below the 69.8°F limit).

The Materials Testing subcontractor issued Corrective Action Report number BCA 036 regarding calibration records on the storage tank chart recording thermometers. The subcontractor concluded there was no impact to the actual temperatures recorded for the storage tanks monitored. To ensure the thermometers were within the required tolerances, the subcontractor and vendor performed a review of thermometer calibration reports. The thermometer vendor planned to reissue calibration reports identifying the standards for calibration.

1.3.3 Conclusions

The inspectors concluded the following:

- The Materials Testing subcontractor procedures addressed the required codes and standards specified in SRD Safety Criterion 4.1-2.
- The Materials Testing subcontractor was not complying with ASTM C 511 requirements for temperature control and calibration associated with the water storage tanks used for storage of concrete test specimens. This was considered two examples of a Finding (Finding IR-02-014-01a & b-FIN).

1.4 Adequacy of Fire Protection Piping System Work Activities (ITP I-138)

1.4.1 Inspection Scope

The SRD, Volume II, Section 4.5, safety criterion required the Contractor to conform with National Fire Protection Association (NFPA) 801, *Standard for Facilities Handling Radioactive Materials*, 1995 Edition. NFPA 801 required conformance with several other NFPA standards, including NFPA-24, *Standard for the Installation of Private Fire Service Mains and their Appurtenances*, 1992 Edition.

The inspectors examined one hydrostatic test package and observed the conduct of hydrostatic testing on three fire protection piping segments to determine whether the testing conformed to established Contractor procedure and NFPA 24 requirements.

1.4.2 Observations and Assessments

The inspectors examined the following documents governing the installation and testing of the Fire Service Water System and determined they complied with the requirements of SRD, Volume II, Section 4.5:

- 24590-BOF-C2-C12T-00031, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 31*, Revision 3, dated September 9, 2002.
- 24590-BOF-C2-C12T-00027, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 27*, Revision 3, dated September 9, 2002.
- 24590-BOF-C2-C12T-00018, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 18*, Revision 2, dated September 10, 2002.
- 24590-BOF-C2-C12T-00022, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 22*, Revision 2, dated September 9, 2002.
- 24590-BOF-C2-C12T-00023, *Firewater, Potable Water, Plant Service Air Yard Utility Composite Plan – Area 23*, Revision 3, dated September 9, 2002.
- 24590-BOF-3PS-PZ41-T0001, *Engineering Specification For Underground Fire Protection Piping Mains*, Revision 2, dated April 22, 2002.

The inspectors examined three Contractor test packages (number 24590-WTP-PTR-P-02-0059, Revision 0, BOF Area 31; number 24590-WTP-PTR-P-02-0064, Revision 0, BOF Area 18, 22, and 23; and number 24590-WTP-PTR-P-02-0065, Revision 0, BOF Area 18, and 22) and verified the proper test boundaries were specified, valve line-ups were thorough, and the required test parameters had been specified. The inspectors verified the calibration of the pressure gauge was current, the appropriate calibration sticker was affixed, and the gauge range conformed to the requirements established by NFPA 24.

The inspectors observed the conduct of hydrostatic testing on a portion of the fire service water piping in Area 18, 22, 23, and 31, and verified the hydrostatic testing had been conducted in accordance with the Contractor's established requirements and NFPA 24, and the system test conformed to established requirements regarding leakage and time at pressure.

1.4.3 Conclusions

The inspectors concluded the Contractor had accomplished hydrostatic testing of firewater piping systems in accordance with established procedure and NFPA 24 requirements.

1.5 Forms, Reinforcement Steel, and Embedded Steel Items Associated with Concrete Placements (ITP I-113)

1.5.1 Inspection Scope

The inspectors examined the Contractor's, and subcontractor's procedures and engineering technical specifications governing the installation of reinforcement steel, embedment plates, and structural concrete, to determine whether the specified activities conformed to authorization basis

and industry codes and standards, specified in the SRD, Volume II, Safety Criterion 4.1-2. Further, the inspectors examined the installation of reinforcing steel and concrete placement activities in the field to assess whether those activities had been conducted in accordance with program, procedure, and authorization basis requirements.

1.5.2 Observations and Assessments

The inspectors examined the following documents governing the installation and inspection of ITS structural concrete:

- 24590-WTP-3PS-D000-T0001, *Engineering Specification For Concrete Work*, Revision 2, dated July 31, 2002.
- 24590-WTP-3PS-DB01-T0001, *Engineering Specification For Furnishing and Delivering Ready-Mixed Concrete*, Revision 3, dated July 31, 2002.
- 24590-BOF-3PS-C000-T0001, *Engineering Specification For Materials Testing Services*, Revision 2, dated July 12, 2002.
- 24590-WTP-3PS-DD00-T0001, *Engineering Specification For Purchase of Standard and Non-Standard Embedded Steel Items*, Revision 1, dated March 8, 2002.
- 24590-WTP-3PS-FA01-T0001, *Engineering Specification For Furnishing of Anchor Bolts (Rods)*, Revision 1, dated February 5, 2002.

The inspectors examined the *Engineering Specification For Concrete Work* and the *Engineering Specification For Materials Testing Services*. A previous review was documented in IR-02-011. However, the *Engineering Specification For Concrete Work* had been revised to Revision 2 since the previous review. The inspectors concluded the revised specification and the other documents described above continued to reference the Codes and Standards required by SRD Safety Criterion 4.1.2 and contained applicable installation requirements to perform the work.

In preparation for a walk down of recently installed reinforcement steel and other components incorporated within the placement, the inspectors examined 52 drawings, in the areas of concrete reinforcement, forming, and arrangement, and examined construction work activities on the High Level Waste (HLW) and LAW buildings for conformance with the requirements of the applicable drawings. The inspectors compared the drawings to a Document Report obtained from Project Document Control (PDC), which contained a revision status that was printed prior to the walk down. From this comparison, the inspectors concluded the drawings were the most current revisions.

The inspectors witnessed in-process final inspections performed by a Contractor QC inspector on the LAW basemat placement LAW-0006, HLW basemat placement HLW-0004B, LAW perimeter wall placement LAW-0015, and HLW basemat placement HLW-0002B. These inspections included verifying top and bottom mat reinforcement steel, interior and exterior wall reinforcement, embed plates, form configuration, clear cover requirements, splice lengths, joint

preparation, and final clean up conformed to applicable drawing and procedure requirements. The inspectors did not witness the QC inspector perform the final inspection of the HLW basemat placement HLW-0003, and HLW basemat placement HLW-0007B, because these inspections had been completed by the QC inspector prior to the inspectors' walk downs. The inspectors performed a general walk down as discussed below. The inspectors concluded the QC inspector was thorough in verifying applicable reinforcement steel attributes as well as being knowledgeable regarding the applicable specifications. The inspectors performed a general inspection of the items noted above, and other attributes shown on the drawings applicable to the items being inspected. The inspectors identified no discrepancies with the items and concluded the inspections performed by the QC inspector were acceptable.

The inspectors examined the Concrete Pour Cards for the placements discussed above, and concluded the required signatures were in place prior to the start of the placements.

The inspectors examined Nonconformance Report (NCR) # 24590-WTP-NCR-CON-02-147 prior to the start of HLW basemat placement HLW-0003. The NCR documented all embeds supplied by American Boiler Works painted prior to August 29, 2002 had suspect coatings. The NCR had a conditional release allowing the Contractor to install the embeds. The Contractor justified the conditional release disposition based on the potential non-conforming or suspect coating being required only on exposed surfaces of embedments and these exposed surfaces could be reworked in installed locations. The location of embeds were required to be documented, and the documentation was attached to the NCR. Closure of the NCR was pending, due to on going documentation of the embeds. The inspectors identified no discrepancies with the actions taken to address the NCR and concluded the Contractor's actions were acceptable.

The inspectors observed Field Engineer staff performing concrete receipt activities and observed their review of the batch tickets and recording information required by Section 3.11.2 of *Concrete Operations (Including Supply)*. The inspectors concluded these activities were performed in accordance with the requirements.

The inspectors observed the Materials Testing subcontractor field technicians performing concrete receipt activities and observed the review of batch tickets and recording of information required by Section 3.2.1 of the *Engineering Specification for Materials Testing Services*. The inspectors concluded these activities were performed in accordance with the specification with the following exceptions. At one of the testing stations, a technician was not recording the running total of yards of concrete batched, as required by Section 3.2.1. This was of concern, because without this information it was difficult to determine the running totals of the concrete volume for the placement. This was brought to the attention of the Contractor and the situation was resolved with the decision they would correct the truck logs to reflect the running totals of concrete batched. The Contractor stated the Materials Testing subcontractor personnel would be made aware of the decision regarding this issue.

The inspectors observed the Materials Testing subcontractor field technicians were not consistently visually observing the concrete mix for consistency and uniformity at the discharge stations as required by Section 3.2.1, *Engineering Specification for Materials Testing Services*. Without this function being performed more than on a random basis, the possibility existed that out-of-tolerance concrete could be introduced into the placement. The Contractor issued

Corrective Action Report (CAR) 24590-WTP-CAR-QA-02-236, dated September 24, 2002. The Materials Testing Services subcontractor issued NCR 20, dated September 25, 2002. Neither the CAR nor the NCR had been resolved or corrective action completed by the close of this inspection. However, the inspectors observed during subsequent placement that Materials Testing subcontractor staff was adequately performing this function. This would be considered an inspection Finding; however, because this issue met the non-cited Finding criteria in Inspection Administrative Procedure A-104, "Inspection Performance," a Finding was not issued. Specifically, the issue was not programmatic and was entered into the Contractor's corrective action program for timely corrective action.

The inspectors examined the conduct of testing for concrete temperature, slump, unit weight, filling and capping the 6" x 12" compressive test cylinders, and field storage of the test cylinders for the placements identified above. The inspectors concluded the Materials Testing subcontractor technicians were performing these testing activities in accordance with their procedures, the applicable ASTM standards, and Contractor specifications.

The inspectors witnessed the placement of concrete on the LAW basemat placement LAW-0006, HLW basemat placement HLW-0004B, HLW basemat placement HLW-0003, HLW basemat placement HLW-0007B, LAW perimeter wall placement LAW-0015 and HLW basemat placement HLW-0002B. The inspectors concluded the concrete was being produced, placed, consolidated, and tested in accordance with procedures, specifications, and required codes and standards. During inspections of the placement of concrete on the LAW Perimeter Wall placement LAW-0015, the inspectors concluded the Contractor was maintaining the 24 inch lift height as required by Section 3.7.4 of, *Engineering Specification for Concrete Work*. This process was being performed by the use of a cut-away tremie system. A document control issue was identified during these concrete placement inspections and is discussed below.

On August 29, 2002, during the HLW-0004B placement, a Quality Assurance (QA) engineer identified that a revision to the rebar design drawing 24590-HLW-DG-S13T-00007003 had occurred just hours before the scheduled placement was to begin. Because the revision had occurred late on dayshift of the day of the placement, field document control had not yet received the new revision. During a computer database review of the drawing revision, the QA engineer learned the revision incorporated Design Change Notice (DCN) 24590-HLW-DCN-S13T-00006 which was supposed to have been posted to the earlier revision of the drawing. However, the controlled stick drawing did not reference the DCN as required by the *Field Project Document Control* procedure. The QA engineer issued Corrective Action Report (CAR) 24590-WTP-CAR-QA-02-200 on August 29, 2002, to address this document control issue. Prior to the HLW-0004B placement, a current revision to the drawing was obtained and verified not to effect the installed rebar. The inspectors discussed this issue with construction management and expressed concern regarding the adequacy of the field controlled stick drawings. Construction management indicated construction would conduct a systematic review of field document control to ensure other controlled stick drawings were current. This activity was not completed in a timely manner.

On September 18, 2002, the inspectors verified the latest revisions to the listed drawings on concrete pour card for placement number HLW-0007B. This was accomplished by using the Contractor's controlled stick drawings at Control Station 140. The following drawings and

revisions were listed on the concrete pour card: (1) 24590-HLW-DB-S13T-00001, Revision 7; (2) 24590-HLW-DG-S13T-00007007, Revision 6; and (3) 24590-HLW-DG-S13T-00007008, Revision 6. The control area 140 stick drawings were 1) 24590-HLW-DB-S13T-00001, Revision 6; 2) 24590-HLW-DG-S13T-00007007, Revision 5 and 6; and 3) 24590-HLW-DG-S13T-00007008, Revision 5 and 6. The inspectors concluded drawing 24590-HLW-DB-S13T-00001, Revision 7 had been released from Project Document Control on August 8, 2002, about 1½ months before the inspection was performed. Drawings 24590-HLW-DG-S13T-00007007 and 24590-HLW-DG-S13T-00007008 had the current revision and old revision on the same stick. Subsequent to identification of this second example of incorrect drawings of the controlled sticks, the Contractor issued CAR 24590-WTP-CAR-QA-02-221, dated August 29, 2002, and performed a full review of the field controlled drawing sticks and identified approximately 30 drawing errors.

Construction procedure 24590-WTP-GPP-CON-7107, *Field Project Document Control*, Revision 0, dated April 15, 2002, paragraph 3.2.3, “Field Project Document Control Supervisor Responsibilities,” stated “The FPDC Supervisor is responsible for implementing the requirements of this procedure, for ensuring that documents are properly received, reviewed, logged, routed and filed, and for ensuring that the current revision of documents are available for use at the construction site.” Failure to ensure current revisions of drawings were available for use at the construction site is considered a Finding against QAM Policy Q-05.1 regarding the requirement to follow procedures, specifically procedure 24590-WTP-GPP-CON-7107 (IR-02-014-02-FIN).

1.5.3 Conclusions

The inspectors concluded the following:

- The Materials Testing subcontractor procedures addressed required codes and standards specified in SRD, Safety Criterion 4.1-2. Testing of the concrete was performed in accordance with the technical specifications, procedures, and the applicable ASTM requirements.
- The Materials Testing subcontractor was not complying with *Engineering Specification For Materials Testing Services*, Section 3.2.1; to visually observe concrete mix for consistency and uniformity. This was considered a non-cited Finding because the Contractor and subcontractor wrote a CAR and NCR, respectively, and was taking timely corrective actions to address this issue.
- Reinforcement steel installations and other attributes associated with the concrete placements for the LAW basemat placement LAW- 0006, HLW basemat placement HLW-0004B, HLW basemat placement HLW-0003, HLW basemat placement HLW-0007B, LAW perimeter wall placement LAW-0015, and HLW basemat placement HLW-0002B were being performed in accordance with the established procedures, specifications, and drawings. Qualified inspectors were performing QC activities for this work in a thorough manner, and the QC inspection activities were adequately

documented. One Finding was identified for failure to ensure current revisions of drawings were available for use at the construction site (IR-02-014-02-FIN).

1.6 Installation of a Temporary Construction Opening in the LAW Basemat (ITP I-113)

1.6.1 Inspection Scope

During the On-location Inspection period July 17 through August 23, 2002, inspectors reviewed the Contractor's actions associated with the installation of a temporary construction opening on the west perimeter wall of the LAW basemat. This review was performed in conjunction with the placement of concrete in location LAW-0002. Inspection report IR-02-011 reported the inspection of placement LAW-0002, but failed to discuss the installation of the temporary construction opening. This section has been prepared to document the results of the circumstances associated with the temporary construction opening inspected during the last inspection period.

1.6.2 Observations and Assessments

During the review of concrete placement LAW-0002, the inspectors observed the installation of a temporary construction opening located on the outside west wall adjacent to concrete placement LAW-0002. To install this opening, the Contractor cut rebar wall dowels protruding above the planned LAW-0002 placement. Rebar installation drawings did not specify cutting this rebar, and neither technical specifications nor procedures specifically authorized the construction organization to perform this modification. Furthermore, the Contractor did not have an approved method to repair the cut rebar once the LAW-0002 concrete placement occurred.

The inspectors discussed this issue with construction management and requested they provide justification for allowing this activity without engineering approval. After some discussion regarding the applicability of engineering specification 24590-WTP-3PI-D000-00001, *Engineering Specification for Concrete Work*, Section 3.5.1, which allowed construction to locate construction joints in the field as required for efficient concrete placements, the Contractor agreed the engineering specification provision was not applicable in this case. Prior to the LAW-0002 placement, the Contractor issued Field Change Request (FCR) 24590-WTP-FCR-C-02-083 which provided engineering approval of the temporary construction opening as requested by construction in the West perimeter wall of the LAW at elevation (-) 21'. The Contractor's methodology for repairing the cut rebar was pending approval and qualification of a rebar coupler design. This rebar coupler method was being qualified at the time of this inspection. Engineering will have to provide approval for the repair, once the splicing methodology is approved.

1.6.3 Conclusions

The Contractor's actions regarding installing a temporary construction opening on the west perimeter wall of the LAW at elevation (-) 21' was initially flawed, in that engineering approval

of the rebar configuration had not been obtained. After inspectors discussed this with construction management, and before the applicable LAW basemat placement was made, an engineering approved FCR was generated to document the rebar modification.

1.7 LAW Cold Joint Recovery Actions (ITP I-113)

1.7.1 Inspection Scope

On July 11, 2002, the Contractor prematurely terminated concrete placement LAW-0001 due to the concrete batch plants' inability to supply concrete at less than or equal to 70°F. This action resulted in an unplanned concrete cold joint. The Contractor issued an NCR and performed a root cause analyses of the event and began taking actions to recover from the event. The original LAW-0001 placement was documented in inspection report IR-02-008, Section 1.8. This inspection focused on an interim review of the Contractor's recover actions to prepare the cold joint for a future concrete placement. Observations of concrete preparation, inspection, and evaluation activities were conducted.

1.7.2 Observations and Assessments

Following premature termination of placement LAW-0001, the Contractor issued NCR 24590-WTP-NCR-CON-02-093, dated July 12, 2002. This NCR documented the existence of the LAW cold joint, an engineering specification (24590-WTP-3PS-D000-T0001) prohibited condition. Immediate corrective actions included clearing concrete from embeds not fully embedded in concrete to expose the embed anchors for future concrete placements, consolidating concrete exposed as part of the cold joint with vibrators, clean rebar and embeds in preparation for future concrete, water cure the exposed cold joint surfaces, cure with curing compound, and cover with insulating blankets. With one exception, the inspectors verified the above immediate actions were taken. As stated in IR-02-008, initially the Contractor inadvertently cured the concrete using a releasing agent rather than curing compound. The inspectors discovered this and a Finding (IR-02-008-01a-FIN) was identified and documented in IR-02-008.

Following implementation of the immediate corrective actions described above, the contractor prepared a supplement sheet for the subject NCR, describing additional actions to prepare the cold joint for future concrete. Preparation stage actions included, for example:

- Squaring off (1" minimum) exposed edges of the finished portions of the placement.
- Removing dirt, laitance, loose aggregate, and unsound mortar.
- Preparing surfaces to prevent trapped air conditions during subsequent placements.
- Cleaning concrete from exposed reinforcing steel.

- Removing concrete from embeds and bolts to a depth that the studs are clear to the extent possible.
- Stepping concrete surfaces and consolidating leading edges by vibration.
- Developing a topographic survey of the cold joint for future analyses during the investigative stage of the NCR disposition.

The inspectors observed over a 3-month period construction crews continuously working on the preparation of the cold joint for future concrete placement. Substantial quantities of concrete was removed to ensure adequate clearance between the cold joint concrete and exposed rebar and embeds, and to square off leading edges to a thickness of approximately 20" or more. When construction believed they had satisfactorily prepared portions of the cold joint for concrete placement, engineering was notified for a final inspection. The cold joint was divided into 10' grids and engineering conducted inspections on each square foot of each of the grids. These inspections were documented on a grid sheet representing the 10' grid being inspected.

Engineering prepared acceptance criteria and conducted inspections of portions of the cold joint. Criteria included a visual inspection and soundness inspection using hammers or other hard service devise to ping on the concrete and listen for the sound of solid concrete. The inspectors observed some of this final inspection and noted QC inspectors were not part of the final inspection team. After discussing this with construction management, QC inspectors were added to the team and the areas previously inspected were re-inspected and some rework was necessary to remove areas identified with unsound concrete. The inspectors performed a detailed inspection of some of the areas previously reviewed by engineering and identified no concerns with the acceptance process that was being used. However, at the time of the detailed inspection, the inspectors were informed the Contractor planned to hire an engineering firm (Olson Engineering, Inc.) that specialized in evaluating civil infrastructures and nondestructive technologies associated with concrete.

The inspectors observed portions of nondestructive examinations of the cold joint surface. The subcontractor (Olson Engineering, Inc) was using Impact Echo (IE) testing and Spectral Analysis of Surface Waves (SASW) testing to determine the adequacy of the remaining cold joint concrete. Test results indicated some areas of the cold joint were acceptable and some areas of near-surface, poor quality concrete would need to be removed. These techniques were able to evaluate concrete at depths that could not be evaluated using the sounding technique with hammers discussed earlier.

The subcontractor prepared an interim report that described the results of the nondestructive examinations and provided recommendations for 9 core samples. The inspectors observed some core sampling and examined the core samples taken. One of the core samples, in the areas where nondestructive examinations had previously indicated near-surface, poor quality concrete, contained some $\frac{3}{4}$ " aggregate size voids. The Subcontractor performed specific nondestructive examinations of the core samples and was planning to examine the core holes for indications of unacceptable voids or poor consolidation indications.

The Contractor planned to remove additional cold joint concrete in the areas identified as having near-surface, poor quality concrete, and these areas will then be re-examined by nondestructive examination before being declared acceptable. In addition, Engineering will be providing an evaluation report to ORP describing the actions taken and an evaluation of the acceptability of the cold joint for future concrete placement before additional concrete is placed on placement LAW-0001.

1.7.3 Conclusions

The activities undergone to date to address recovery actions associated with the LAW concrete cold joint has been acceptable. The Contractor plans additional work to prepare the cold joint and to evaluate the cold joint for future concrete placements.

1.8 Industrial Health and Safety (IH&S) Oversight (ITP I-161)

1.8.1 Inspection Scope

The inspections in this area focused on the Contractor's implementation of the Contract industrial health and safety requirements described in the Office of River Protection Manual (ORPM) M 440.1-2, *Industrial Hygiene and Safety Regulatory Plan for the Waste Treatment Plant Contractor*. Specifically, the inspectors assessed compliance to the requirements of the Contractor's *Non-Radiological Worker Safety and Health Plan*, PL-W375-IS00001, Revision 1, dated March 12, 2001, for the River Protection Project-Waste Treatment Plant, which had been reviewed and approved by the Office of Safety Regulation (OSR), along with applicable requirements specified in ORP M 440.1-2. Areas reviewed included concrete placement, installation of forms, rebar, and embedments to grade, hoisting and rigging, trenching and shoring, and other operational areas.

1.8.2 Observations and Assessments

a. Trenching/Shoring

On August 28, 2002, the inspectors evaluated the Contractor's trenching operations to determine compliance with their excavation permits (listed below), which required all un-shored exposed faces to be maintained at a slope of 1.75:1. The inspectors observed, and explained to the Contractor, that two areas of the trenching operations, governed by excavation permit numbers 24590-WTP-EXPM-CON-P-02-067, dated August 8, 2002, and 24590-WTP-EXPM-CON-P-02-082, dated August 23, 2002, had face slopes that did not conform to the criteria for safe personnel entry.

Personnel had been recently working in the bottom of the South end of a freshly excavated trench West of the T-1 facility, which was estimated by the inspectors to be steeper than 1:1. The trench was about 12-13 feet in depth. At the time of the inspection, the laborers' foreman was instructed by the Contractor's Industrial Health and Safety Representative to restrict all personnel from working in that portion of the trench until the proper slope was provided. The

Contractor's superintendent was requested to meet with the inspectors and the Industrial Health and Safety Representative to examine the deficiency and discuss appropriate actions. Personnel were restricted from this section of the trench and it was taped off with red "danger" tape. The inspectors observed an excavator re-sloping the faces of the trench later that same day.

At another trench, north of the visitor's trailer, a surveyor was standing on the ground, adjacent to the outside of a trench box (shoring), below an undercut overhang of approximately 2 cubic yards of soil. The inspectors noted that stress fractures had been seen on the surface of the overhang (finished grade level). The laborers were inside of the trench box. The surveyor exited the trench upon the inspectors' arrival to the site. The laborers were adequately protected from the potential danger from the sloughing overburden. However, the surveyor had not been protected. The laborers stayed inside the box the entire time the inspectors were in the area. The Industrial Health and Safety Representative informed the survey crew supervisor that this practice was not allowed. Further, the superintendent was requested to slope the overhang. The inspectors determined the Contractor had made necessary corrections to conform to requirements of the above referenced excavation permits.

The inspectors also examined the two trench boxes that were used within the above mentioned trenches. The Industrial Health and Safety Representative informed the inspectors that both numbered boxes had been inspected for structural integrity prior to placing them in service. The Contractor's competent person had considered them safe for service. The inspectors reviewed the documentation for both boxes (shoring) and determined both had been constructed for intended use and stamped by a registered professional engineer, in accordance with 29 CFR 1926, "Safety and Health Regulations for Construction."

b. Industrial Hygiene

The inspectors examined the equipment used by the Contractor's Industrial Hygienists to monitor and sample the worker's chemical and physical environment. The inspectors also examined the calibration instruments and challenge gases used for direct reading instruments. The equipment was maintained in accordance with industry standards and the mix and number of instruments on hand or in the procurement process was adequate to provide the necessary monitoring for construction personnel.

The inspectors examined the storage areas for respirators and respirator repair parts, such as harnesses and exhalation valves, etc. Most were found to have been stored in a Conex container and were tightly sealed from dirt contamination. However, some of the N-95 respirators were open to general contamination and one unsealed and soiled respirator, identified by the inspectors, was discarded by the Industrial Health and Safety Representative. The spare parts were sealed and in a box on the floor. The area for storage of respirators and parts was not controlled and was not capable of being kept clean. Any time an individual needed a respirator or part, the entire package was opened, the protective seals to other parts were compromised, and the items were subject to contamination from the soil inside the container. The Industrial Health and Safety Representative informed the inspectors a trailer was being procured to store, maintain, repair, and issue all respirators. The proposed new facility should help in assuring good control of respirators and parts. The inspectors concluded the existing storage and controls,

although rudimentary and typical of a short-term construction operation, met the requirements of ORP M440.1.

In the area of site drinking water sanitation, the Contractor stored, filled, distributed, cleaned and sanitized the many carboys for drinking water stations throughout the site. During the peak hot periods, the Contractor provided up to 560 containers of drinking water per week throughout the site. The water and ice was delivered to a temporary facility in the North part of the site from a local vendor and poured into the clean carboys for site delivery. The cleaning and sanitizing of the containers were performed in the trailer area and procedure 24590-WTP-GPP-SIND-047-0, *Construction Site Drinking Water*, dated July 3, 2002, governed the work. Although no cleaning or sanitizing was being accomplished during the inspection, some of questions posed by the inspectors to the foreman regarding sanitizing and cleaning techniques were answered in a vague fashion. The inspectors and the Industrial Health and Safety Representative observed housekeeping needed improvement. The Contractor informed the inspectors a Quality Assurance audit of the drinking water program had been completed. One worker pointed out to the inspectors that the tamper tape, used to seal the containers, could easily be compromised without any appearance of contact. The Industrial Health and Safety Representative took note of the problem and committed to resolve the deficiency.

The inspectors concluded the actions that had been taken by the contractor after the inspection and audit resulted in conformance with their procedure. Further, the Contractor demonstrated alternative methods they would employ to correct any tamper tape issues.

The inspectors reviewed the sampling results of personnel air samples taken on employees and how they were filed, and discussed how the results were reported to the sampled workers. The inspectors also observed the Contractor's database of confined spaces throughout the site along with air sampling histories and classification designations.

With one exception, the industrial hygiene program was in conformance with the requirements of ORP M 440.1-2, *Industrial Hygiene and Safety Regulatory Plan for Waste Treatment Plant Contractor*. The Contractor needed to provide assessments of their subcontractor industrial hygiene programs to ensure compliance, as specified within Section 1.1, was consistent throughout the worksite. The Contractor provided the inspectors with a satisfactory method to periodically track industrial hygiene activities of their subcontractors and lower tier subcontractors to conform to the above referenced requirements.

c. Forms, Rebar, and Embedments

The inspectors observed workers preparing the rebar and the erection of the wall panels/forms for the LAW exterior wall to grade. All workers were tied off above the six-foot level in accordance with Contractor requirements. Those workers, who were attaching the panels, were equipped with retractable fall arrest systems which were anchored to a suspended spreader bar. The inspectors concluded, by observation of the crane capacity and "locked out" state coupled with the rigging, the anchors for those working on the panel faces met the anchorage requirements specified by 29 CFR 1926.502(d)(15), "Fall Protection Systems Criteria and Practices." However, the inspectors questioned the adequacy of the anchorage used by personnel who were tying off on the vertical rebar members. Those personnel were tying off on the

vertical rebar member where it bisected the wire tied horizontal rebar member. The Industrial Health and Safety Representative was requested by the inspectors to provide necessary documentation that the designated anchorage points complied with 29 CFR 1926.502(d)(15). Appropriate engineering analysis was provided to the inspectors, which specified the practice of tying off on the rebar conformed to the requirement.

The inspectors observed, during a concrete wall placement, tripod retrieval devices had been provided on the top of the wall to provide extraction of injured persons, should it be required. This was adjunct to the planned use of a crane. Further, a baseline monitoring of oxygen levels was provided during the entire placement within the wall void. The results of the oxygen monitoring demonstrated no oxygen depletion.

During the placement of concrete, all workers were either tied off or working on an approved scaffold. One worker was observed by the inspectors stepping outside the boundary of the scaffold structure to man the concrete pump elephant trunk. This deficiency was brought to the attention of the Contractor and the practice was stopped on-the-spot.

The inspectors observed some portable welding generators were not equipped with grounding leads and grounds. The Contractor provided the inspectors with a compliance interpretation, based upon the National Electrical Code, that generators used under the conditions observed did not require grounding. The inspectors determined the documented written interpretation was acceptable.

The Contractor had initiated a revised Safety Task Analysis Risk Reduction Talk (STARRT) card. The new card included more employee safety attributes, additional space for feedback, and required the foreman, general foreman, and superintendent to sign the completed card. The inspectors found the new safety signs clear, concise, and understandable.

The inspectors observed the Contractor had provided sun shielding, a breathable fabric, for break areas within the HLW and LAW area. Within the HLW area, the Contractor had also shielded a welding area with this breathable fabric. The inspectors requested the Contractor ascertain whether this fabric was appropriate for use in a welding area based upon its flame-spread rating. The Contractor provided the inspectors with a data sheet from the material vendor, which indicated the fabric had negligible flame spread properties. The inspectors concluded the material could be safely used.

d. Hoisting and Rigging

The inspectors were notified a leased, conventional equipped, mobile crane would be provided to erect and assemble the tower cranes. The crane was to be used until the Contractor owned luffing configuration crane was placed back in service. The inspectors requested the Contractor's equipment superintendent notify the inspectors when training, testing, inspection, and qualifications activities associated with the new crane were completed, prior to placing the leased crane into service. The Contractor informed the inspectors all applicable commitments specified within RP-BNRP-RPPWTP-2002-006 (occurrence report dealing with the luffing crane) would be applied to the leased crane. The inspectors observed the assembly and delivery of the leased crane components and witnessed the initial erection of the boom (in the cab) with

the operator. The inspectors returned to validate and evaluate the training, maintenance, inspection files, and reports on the leased crane with the Contractor General Foreman. The inspectors also examined the crane for necessary switches and stops for boom angle and slewing devices. Further, the inspectors spent some time with the operators and the oiler to assess their level of confidence that the safety systems provided would function as designed. The inspector, based upon a comprehensive review of all of the above, concluded the Contractor had met their on-site validation commitments.

During the assembly of the boom, the inspectors observed two ironworkers working approximately 12' above grade without fall protection. After bringing this to his attention, the Contractor Superintendent corrected the work practice on-the-spot.

In the area of tower cranes, the inspectors observed the partial assembly of the tower cranes with the Contractor Superintendent and others, interviewed the vendor's representative (the qualified person), and reviewed the drawings and specifications. To the point of assembly, the inspectors concluded the Contractor had conformed to the "required" specifications of American Society of Mechanical Engineers (ASME) B30.3-1966, *Tower Cranes*. However, ASME B30.3, Section 3-1.17, included recommendations to provide powered access to the cab and sanitary facilities within the cab. Neither of these recommendations was contained within the drawings or specifications. The Contractor informed the inspectors the provision will be provided and an upgrade to the current tower crane systems were underway but would not be available until after the cranes were put in service.

1.8.3 Conclusions

The inspectors concluded, with the exception of a few minor instances, the Contractor had acceptably implemented the program for industrial health and safety. Identified discrepant conditions were promptly and acceptably corrected. The inspectors determined the Contractor had met the applicable requirements of ORP M 440.1-2.

2.0 EXIT MEETING SUMMARY

The inspectors presented preliminary inspection results to members of Contractor management at an exit meeting on October 10, 2002. The Contractor acknowledged the observations and conclusions. The inspectors asked the Contractor whether any materials examined during the inspection should be considered limited rights data. The Contractor stated no limited rights data were examined during the inspection.

3.0 REPORT BACKGROUND INFORMATION

3.1 Partial List of Persons Contacted

J. Betts, Deputy Project Manager
F. Beranek, Environmental, Safety, and Health Manager

D. Klein, Nuclear Safety Manager
 G. Shell, Quality Assurance Manager
 B. Niemi, Safety Program Engineer
 E. Smith, Safety Program Engineer
 D. Foss, Safety Programs Engineer
 M. Ensminger, Quality Control Supervisor
 W. Clements, Site Manager
 G. McClain, General Superintendent
 S. Jabbour, Geotechnical Engineer
 R. Pohjola, Lead BOF Civil Field Engineer
 G. Torres, Subcontract Coordinator
 D. Neal, QA Engineer
 S. Sunday, QA Engineer
 F. Boozer, Lead QC Engineer
 M. Weaver, Lead Civil Field Engineer, LAW Building

3.2 List of Inspection Procedures Used

Inspection Technical Procedure I-112, "Geotechnical/Foundation Inspection"

Inspection Technical Procedure I-113, "Structural Concrete Inspection"

Inspection Technical Procedure I-138, "Inspection of Fire Protection System Inspection, Testing, and Maintenance"

Inspection Technical Procedure I-161, "Industrial Health and Safety Inspection"

3.3 List of Items Opened, Closed, and Discussed

Opened

IR-02-014-01a-FIN Finding

Failure to ensure the concrete curing tank temperature monitors were calibrated in accordance with ASTM E77.

IR-02-014-01b-FIN Finding

Contrary to ASTM C511-98, the Materials Testing subcontractor was utilizing only one 7-day chart recorder thermometer, located within the middle tank of each of the three and four tank in-line configurations, rather than the requirement to monitor each tank.

IR-02-014-02-FIN Finding

Failure of the Field Document Control Manager to ensure current revisions of drawings are available for use at the site.

Closed

None

Discussed

None

3.4 List of Acronyms

AB	authorization basis
ACI	American Concrete Institute
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Material
BNI	Bechtel National, Inc.
BOF	Balance of Facilities
CAR	Corrective Action Report
DCN	Design Change Notice
DOE	U.S. Department of Energy
FPDC	Field Project Document Control
HLW	High Level Waste
IE	Impact Echo
IH&S	Industrial Health and Safety
IR	Inspection Report
ITS	important-to-safety
LAW	Low Activity Waste
NCR	Nonconformance Report
NDE	Nondestructive Examination
NFPA	National Fire Protection Association
ORP	Office of River Protection
ORPM	Office of River Protection Manual
OSR	Office of Safety Regulation
PDC	Project Document Control
QA	Quality Assurance
QAM	Quality Assurance Manual
QC	Quality Control
SASW	Spectral Analysis of Surface Waves
SC	Safety Criteria
SRD	Safety Requirements Document
STARRT	Safety Task Analysis Risk Reduction Talk
WTP	Waste Treatment and Immobilization Plant